

REMARKS

In response to the Office Action mailed April 18, 2002, the Applicants respectfully request reconsideration.

Claims 1-18 were previously examined. By this amendment, Applicants amends claims 1 and 7, and adds claims 19 and 20. As a result, claims 1-20 are pending for examination, of which claims 1, 7, 19 and 20 are independent.

1. Summary of Telephone Interviews

Applicant's representative, Dan McLoughlin, appreciates the courtesies extended by Examiner Nadav in granting and conducting telephone interviews on August 8, 2003 and August 18, 2003, which are fully summarized below.

During the August 8 interview, Applicant's representative sought clarification from Examiner Nadav regarding the Office Action's assertion that Aiello teaches in Fig. 10 an isolation region 5, 34 coupled to substrate 3 *through a high impedance n-region 4*. (Section 3, page 3, last paragraph; section 6, page 10, second paragraph). Examiner Nadav noted that the term "coupled" has a broader meaning than the term "connected", and that in claim 1, a "a second bipolar transistor . . . coupled to the isolation region" means that the second bipolar transistor has an electrical influence on the isolation region. In response to this statement, Applicant's representative asked whether it was the Examiner's position (as it appeared to be from the Office Action) that the term "connected to" in claim 1 means "in the same circuit as", such that two connected elements are two elements in a same circuit, regardless of the number of other elements and regions that are disposed between the two elements. Examiner Nadav confirmed that this is his position. Without acceding to these interpretations of "coupled" and "connected," Applicant respectfully abstains herein from commenting on them, as claim 1 as amended (and each of the remainder of the claims) patentably distinguishes over Aiello for the reasons set forth below, even if such interpretations are correct.

Further, Examiner Nadav, adopting a broadest reasonable interpretation of the claims, asserted that the n-region 4 has a relatively low conductivity and thus a high impedance. Thus, he reasoned, when the substrate potential is lower than the reference potential, the isolation

region is coupled to the substrate through the high-impedance n-region 4. In response, Applicant's representative explained that this interpretation is not reasonable in the context of the application, as "coupling the isolation region to the substrate through *a high-impedance* when the substrate potential is lower than the reference potential" properly construed in the context of the application means "coupling the isolation region to the substrate through *a path that behaves similar to an open circuit* when the substrate potential is lower than the reference potential," which is not taught by Aiello. The Examiner asked Applicant's representative to point out this teaching in the application. Applicant's representatives asked for the opportunity to review the application in light of the Examiner's comments, and then call him back. Examiner Nadav agreed.

Without acceding to the Examiner's interpretation of "high impedance", Applicant respectfully abstains herein from commenting on such interpretation, because claim 1 as amended (and each of the remainder of the claims) patentably distinguishes over Aiello, for the reasons set forth below, even if such interpretation is correct.

On August 13, 2003, Applicant's representative called Examiner Nadav to propose amendments to claims 1 and 7 (which are made herein) that further distinguish claims 1 and 7 from Aiello, and left a voice mail for him. After the call was not returned by August 15, Applicant determined to file this Amendment by August 18 so as to not delay prosecution any further. Examiner Nadav returned the call on August 18. He did not have possession of the application file, having returned it to filing on August 8 after Applicant's representative did not call back on that day. Accordingly, Applicant's representative briefly explained the amendments to claims 1 and 7 herein, and how these amendments further distinguish the claims over Aiello, and explained that the amendment would be filed on August 18, 2003 so as to not delay prosecution any further.

2. New claims 19 and 20 Are in Condition for Allowance

Applicant notes with appreciation the Office Action's position that claims 12 and 17 would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claim (Section 4, page 9). In response, as shown above, Applicant

has added new claims 19 and 20, which reflect claims 12 and 17, respectively, amended to include all of the limitations of respective independent claims 1 and 7 (there are no intervening claims). Accordingly, Applicant respectfully submits that new claims 19 and 20 are in condition for allowance.

3. Claims 1-6 and 10-14 Patentably Distinguish Over Aiello

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over U.S. Patent No. 5,382,837 (Aiello). Applicant respectfully traverses this rejection for at least the following reasons.

3.1 Discussion of Aiello

The discussion of Aiello set forth in Applicant's previous Remarks submitted January 22, 2003 is hereby repeated for the Examiner's convenience, with parts of the discussion highlighted in bold for emphasis.

Aiello is directed to a switching circuit that connects a first circuit node to either a second or a third circuit node relative to a voltage potential on the third circuit node, and that controls the potential of an insulation region of an integrated circuit in relation to the potential of the substrate. (Col. 1, lines 7-12).

Aiello discloses several embodiments of the switching circuit (Figs. 1-6). Each embodiment includes a transistor T1 having an emitter connected to a ground potential, a collector connected to a an insulation region (Viso) and a base coupled to a power supply Vcc through a resistor R1. Each embodiment further includes a transistor T2 having an emitter connected to a substrate (Vsub) and a collector connected to Viso. (Figs. 1-6; Col. 3, line 37-col. 6, line 38). Some embodiments (Figs. 3-6) include a transistor T4 having an emitter connected to the base of T2, and some embodiments (Figs. 2, 4 and 6) include a transistor T3 having an emitter connected to Vsub, a collector coupled to Vcc through a resistor R1 and a base connected to the base of T2.

Aiello discloses that, when the potential of the substrate is greater than a reference potential (i.e., $V_{sub} > \text{zero}$), T2 is off and T1 is in saturation mode, thereby coupling the insulation region to the ground voltage. (Col. 3, line 59-col. 4, line 3; col. 4, lines 34-46)

Thus, when the substrate potential is greater than the reference potential, the insulation region is coupled through a low impedance to the ground voltage.

Contrary to the assertions of the Office Action (Section 3, page 3, lines 3-6), Aiello does *not* disclose that the transistor T4 (Figs. 3-6) couples the insulation region (Viso) to the substrate (Vsub) *through a high impedance* when the substrate potential is greater than the reference potential. In contrast, **when the substrate potential is less than a reference potential** (i.e., $V_{sub} < \text{zero}$), T1 is off or reverse-biased and **T2 is in saturation mode, thereby coupling the insulation region to the substrate.** (Col. 4, lines 4-24, 47-54; Col.6, lines 14-17). Thus, when the substrate potential is less than the reference potential, the insulation region is coupled through a *low impedance* to the substrate—i.e., through the conduction path between the collector and the emitter of transistor T2, which is operating in saturation mode.

3.2 Claim 1 is Not Rendered Obvious by Aiello

The Office Action asserts that it would have been obvious to a person of ordinary skill in the art to use Aiello's switching circuit as a protection structure against polarity inversion of a substrate potential. Applicant agrees, as Applicant describes using Aiello's switching circuit as a protection structure in the specification. (Page 3, lines 6-19).

Claim 1 has been amended as shown above to further clarify how claim 1 patentably distinguishes over Aiello. This amendment is supported by the written description on page 5, line 33 through page 6, line 5 (i.e., when the substrate is biased to a negative potential, Q33 is off).

Claim 1 distinguishes from Aiello because Aiello fails to disclose or suggest an integrated circuit including, *inter alia*, a protection structure against polarity inversion of a substrate potential comprising a first bipolar transistor with an emitter connected to said isolation region and a collector connected to a reference potential input of the integrated circuit, a bias circuit for biasing the first bipolar transistor in a reverse saturated mode when the substrate potential is higher than the reference potential, and **a second bipolar transistor** with an emitter connected to the substrate and a base coupled to the isolation region **for coupling the isolation region to the substrate through a high-impedance when the substrate potential is lower**

than the reference potential and the first bipolar transistor is off, as recited in claim 1. In contrast to claim 1, Aiello discloses that, when a substrate potential is lower than the reference potential, the first bipolar transistor (T2 according to the Office Action, page 3, line 6) is *not* off, but is operating *in saturation mode*. Further, Aiello discloses that, when the substrate potential is lower than the reference potential, the insulation region is coupled to the substrate *through a low impedance*, i.e., through the emitter and collector of T2, which is in operating in saturation mode.

Therefore, for at least these reasons, claim 1 is not rendered obvious by Aiello. Accordingly, Applicant respectfully requests that the rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Aiello be withdrawn.

Claim 2-6 and 10-14, which each depend directly or indirectly from claim 1, are patentable over Aiello for at least the same reasons as set forth above with respect to claim 1. Accordingly, Applicant respectfully requests that the rejections of claims 2-6 and 10-14 under §103(a) be withdrawn.

4. Claims 7-9 and 15-18 Patentably Distinguish Over Aiello

Claim 7 has been amended as shown above to further clarify how claim 7 patentably distinguishes over Aiello.

Claims 7-9 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over U.S. Patent No. 5,382,837 (Aiello et al.) Applicant respectfully traverses this rejection because Aiello fails to disclose or suggest all of the limitation of claim 7. Specifically, Aiello fails to disclose or suggest a semiconductor device, comprising: a vertical power component having a terminal formed by a substrate of a first conductivity type; a control circuit, isolated from the substrate by an isolation region of a second conductivity type; and a protection structure against polarity inversion of a substrate potential, comprising: a first bipolar transistor having an emitter connected to said isolation region and a collector connected to a reference potential input of the integrated circuit; a bias circuit that biases the first bipolar transistor in a reverse saturation mode when the substrate is at a potential higher than a reference potential; and **means for coupling the isolation region to the substrate through a**

high impedance when the substrate potential is lower than the reference potential and the first bipolar transistor is off, as recited in claim 7.

Therefore, for at least these reasons, claim 7 is not rendered obvious by Aiello.

Accordingly, Applicant respectfully requests that the rejection of claim 7 under 35 U.S.C. §103(a) as being unpatentable over Aiello be withdrawn.

Claims 8, 9 and 15-18, which each depend directly or indirectly from claim 7, are patentable over Aiello for at least the same reasons as set forth above with respect to claim 7. Accordingly, Applicant respectfully requests that the rejections of claims 8, 9 and 15-18 under §103(a) be withdrawn.

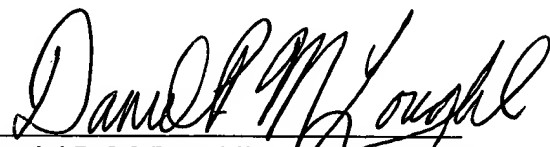
CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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